

Perception of Vocational High School Students in Makassar towards Working Environment and Preparedness in Facing Industrial World

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Abstract. Vocational schools graduates are expected to survive in working environment. They are provided with variety of experiences both academically and technically to succeed in facing demands and needs in the industrial world. This study aims to explore the students' perception towards working environment and preparedness in facing industrial world. This quantitative study involves 350 vocational high school students majoring Mechanical Engineering in Makassar. The data is collected using questionnaire and documentation, then the data is analyzed with descriptive statistics and correlational using SPSS 22 version. The result shows that 1) the students' perception towards working environment is categorized as high (53.15%), 2) the students' perception towards their preparedness in facing industrial world is categorized as high (50.86%), and 3) there is a significant correlation among students' perception, working environment and their preparedness in facing industrial world (75.6%).

1. Introduction

The Industrial Revolution 4.0 had such a rapid impact on various sectors, especially in the industrial world. This is marked by automatization non-based technological developments. The role of technology with new approaches can elaborate on the physical, digital, and biological worlds fundamentally in changing human interaction and patterns of life (Tjandrawinata, 2016). These changes provide opportunities and challenges for the industrial world, causing a paradigm shift towards human resources that must have excel quality, skillfull, and competitiveness.

Education as human resources with a variety of knowledge, skill, high work ethic, professionalism, and competitiveness in facing competition on labor sector globally. Regarding to this, Wolter identified the challenges of industry 4.0 as follows; (1) information technology security issues; (2) reliability and stability of production machines; (3) lack of adequate skills; (4) The reluctance of the stakeholders to change; and (5) decrease of employment because it turns into automation.

Vocational high school as one of the formal education institutions that substantially has a pattern and orientation in directing, preparing and developing students as graduates who are ready to work in the industrial world with various competencies relevant in their fields. Regarding to this, Baiti (2014: 165) argues that vocational schools are means for developing knowledge, creating skilled and up to date workforce needed by industry. Similarly Kennedy, (2011) states that vocational education is also directed at increasing the independence of individuals in entrepreneurship in accordance with their

competencies. This is reinforced by Wang's opinion (2012: 2), which states that vocational education is focused on providing students with various specific competencies, skills, behaviors, and attitudes of cooperation and social responsibility in entering the world of work

Vocational graduates are expected to be able to work and meet all the demands and needs of the industrial world as a mid-level workforce, which ideally is a workforce that is ready to use and can work in the industrial world. The World Bank (2017) launches that the job market requires graduates' multi-skills forged by education units and systems, both secondary and tertiary education. However, the existence of vocational education is still considered premature in printing skilled and ready-to-use human resources. It is marked by the quality of vocational graduates who should be able to fill opportunities and challenges in the world of industry inversely proportional to reality in the field. The 2018 BPS data noted that the number of unemployed people who came from Vocational High Schools was at the top of 11.24%. The data shows that there are problems in the system of implementing vocational education (SMK) with the employment sector which is caused by: (1) the low quality of education providers in producing vocational graduates who are ready for work and the ability of the economy to provide employment; (2) not all SMK graduates can meet the demands of employment both in terms of qualifications and specialization; (3) unpreparedness of SMK graduates in entering the workforce and industry; and (4) the low achievement of vocational competencies, that make the skills possessed by SMK graduates are not in accordance with what is needed by the industrial world.

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Sudjani (2014) argues several factors causing the low acceptance of vocational school graduates in industry: (1) graduates are lack of knowledge and competencies; (2) inability to plan what to do after graduate from school, wheter it is looking for a job, go to colleges, or entrepreneurship; (3) lack of understanding of information about types of work; (4) inability to integrate their skills and their chosen job; and (5) inability to decide what type of work they want to have. In other words, the problems lied in the on the system of providing vocational education (SMK) in creating and facilitating the work environment as a supporting factor for the graduates with various skills both academically and technically in entering the industrial world.

The results of the study in several countries conducted by Halimuddin (2014), indicate that institutions that implement industrial practice (apprenticeship) to simulate the actual work environment produce students with a variety of knowledge and experience and have better skills and expertise. But in reality, based on the results of existing studies in one of Vocational Schools in Makassar shows that; (1) the implementation of practical learning that have not represented the actual conditions in the industry; and (2) the gap between skills or competencies needed in the industrial world. This is an

indication that the vocational education system has not been fully able to create an atmosphere that is similar to the industrial world, so that not all vocational graduates can meet the needs of both qualifications and specialization, thus impacting their readiness in entering the industrial world.

The existence of vocational education in preparing prospective and skilled middle-class workers is very important in contributing to the development of industrial and business world. Vocational high schools, as a media to produce graduates who are ready to work, are required to have special characteristics that are in line with the industrial world, so that they can provide benefits and impacts for the graduates to become skilled workers in their fields. According to Sudjimat (2014), the educational characteristics that suitable for vocational schools are to equip students with a variety of cognitive (academic) and technical skills (vocational) as well as various soft skills (attitude, employability skills, or generic skills) that are needed in an integrated manner in shaping student competence to work in the chosen field.

Vocational learning is effective and efficient when the content is a replica of the condition of the industry. With the identical conditions between vocational schools and employment, students are expected to be responsive and accustomed to thinking in the work environment. Therefore, vocational schools as the provision of vocational education must be in accordance with the first principle in vocational education introduced by Charles Prosser and Quigley Thos, "Vocational education will be efficient in proportion as the environment in which the learner is trained is a replica of the environment in which he must subsequently work". Therefore, vocational learning is focused on shaping students' knowledge in developing vocational competencies in academic skills, technical skills and value management aspects as well as aspects of attitudes to support their potential development.

The work environment is one of the most important aspects in improving the quality of SMK graduates, especially preparing skilled and professional workforce in entering the industrial world. The work environment for students is a place where they can build their competencies that are in accordance with their fields of interest. Sutrisno (2009) argues that the work environment is an infrastructure that exists around employees who are doing their job that can affect their work including workplaces, facilities, cleanliness, lighting, tranquility, as well as relations between people in the place.

Andam (2013) states that the work environment is related to work motivation. Similarly, Kahya (2007) revealed that there is a substantial relationship between the performance of employees, the level of work, and the environment (physical work, physical conditions of the work environment, and work safety). In addition, in the context of vocational learning it can shape students' knowledge in developing work readiness which includes academic skills, technical skills, values, and aspects of attitudes to support their potential development. The work environment is a very important component in carrying out practicum, by paying attention to a good work environment or creating working conditions that can motivate students to face the industry.

The vocational learning process needs to focus on the work environment and the factors that can support the formation of graduates' readiness in entering the industrial world. Therefore there is a need for research that can provide an overview and information to students about the work environment that can form skills in accordance with their fields, so that it can have an impact on work readiness in entering the workforce. Therefore, based on the description of the problem above, this study will examine the students' perception of the work environment and the factors that influence their readiness in entering the industrial world.

The purpose of this study is to reveal: (1) the students' perception of the work environment in the world of the Vocational Industry; and (2) the students' perceptions of readiness in entering the industrial world.

2. Research Method

1.1. Research Design

Based on the description, the design of this study is a quantitative approach with a survey method, in which researchers describe quantitatively the trends, behaviors or opinions of a population by examining the population sample (Creswell, 2013). The variables in this study consisted of independent variables Student perceptions of the work environment in the industrial world (X) and Student perceptions of readiness to enter the industrial world (Y).

1.1.1. Population and Sample

The population in this study were eleventh grade students majoring machining engineering in state and private vocational schools in Makassar. Vocational schools in Makassar that provide Machining Engineering Expertise are SMK Negeri 5 Makassar, SMK Kartika XX-1 Wirabuana Makassar, SMK Negeri 2 Makassar, and SMK Negeri 1 Sulawesi Selatan with 425 students in 2018/2019 academic year. The sampling technique used in this study is proportional random sampling, this sampling technique must be population-level and proportional (Widiyanto, 2013). The sample from the respondent group is allocated proportionally to each strata or group of the population. To obtain a total sample in this study used the Taro Yamane formula (in Riduwan and Akdon, 2013) with a specified level of precision (error rate, $\alpha = 5\%$), then the total number of samples is 350 students.

1.1.2. Technique of Collecting Data

The data was collected using documentation and questionnaires. The instrument used was in the form of a questionnaire with a type of closed questionnaire, namely a questionnaire whose answer was prepared so that respondents only had to choose the answer. The statement in the questionnaire is guided by the indicators of the research variables outlined in a number of questions, in the form of objective and positive statements so that the respondent only needs to mark the checklist on one of the alternative answers that is considered most appropriate to the respondent's condition. Questionnaires used refer to the Likert Scale by using alternative four-scale answers, so that the data produced in the form of intervals while the test used is a series of questions to measure skills, knowledge, abilities or talents possessed by individuals or groups. Usually the test method used in data collection is to measure the presence and the magnitude of the basic abilities or achievements of a person as a subject in the study. Formulation of statements in the questionnaire and the tests are based on indicators of the research variables used.

1.1.3. Research Instruments

The instruments try-out covers validity and reliability tests. Validity test consists of validity construct and item validity. The result of item validity is 75 items out of 100 items. Based on the validity tests to 50 students, 25 items are invalid and 75 items are valid. The result of reliability of each variable is: (1) *cronbach's alpha* for variable X is 0,727 and (2) for variable (Y) is 0,825. Alpha score of all variables is $> 0,700$ therefore it can be stated that the questionnaire for all variables are valid and reliable, and suitable for collecting the data.

1.1.4. Technique of Data Analysis

Data analysis carried out in the study consists of (1) inferential descriptive statistics. Descriptive statistical analysis is used to describe data based on central tendency and dispersion. Central tendencies are the mean, median, minimum value, and maximum value; (2) The prerequisite test is

carried out with the aim to fulfill the hypothesis test requirements which include normality test and linearity test, and (3) Hypothesis testing using simple regression analysis techniques on functional or causal relationships of one independent variable with one dependent variable using SPSS program assistance 20 with 5% significance level to see how much the contribution given by the independent variable to the dependent variable.

3. Result and Discussion

The result of the study is description of each variable, prerequisite test, and hypothesis testing. Berikut ini merupakan uraian hasil penelitian. The following is a description of the results of the study.

1.2. Data Description

The description of the data presented uses descriptive statistical techniques aims at providing information through drawing data. Description of the data of each variables covers: mean, standard deviation, median, modus, and histogram of frequency distribution. For variable (X). Based on the results of the analysis carried out using Statistical Product and Service Solution (IBM SPSS Statistics 22), the results of the analysis can be presented as shown in table 1 below.

Table 1. Descriptive statistics of the students' perception on the work environment in industry (X)

N	Valid	350
	Missing	0
Mean		318,2429
Median		154,0000
Mode		354,00 ^a
Std. Deviation		24,14430
Range		72,00
Minimum		170,00
Maximum		235,00

a. Multiple modes exist. The smallest value is shown

It is known that the students' perception towards work environment has mean score = 318,24 Standard Deviation= 24,14, Median = 154, Modus = 354, Maximum score = 235 and Minimum score = 170

Table 2. Proportion of student perception variables on the work environment in the industry

No	Category	Interval	Frequency	Proportion
1.	Very High	> 121,65	78	22,28%
2.	High	104,6 – 121,75	186	53,15%
3.	Low	87,26 – 104,5	41	11,72%
4.	Very Low	< 87,25	45	12,85%
	Total		350	100,00%

Based on the above standard scores, it can be seen that 78 students (21,428) are in the very high category, 186 students are in the high category (53.15%), 41 students are in the low category (11.72%) and 45 students are in the category very low (12.85%). Therefore, it can be concluded that the students' proportion on work environment is in high category (53.15%).

For student perceptions of the readiness to enter the industrial world (Y), the results of the analysis carried out using IBM SPSS Statistics 22. can be presented as follows:

Table 3. Descriptive statistics of students' perception variables towards their readiness to enter the industrial world (Y)

N	Valid	350
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	Missing	0
Mean		157,9475
Median		241,0682
Mode		87,32 ^a
Std. Deviation		26,69014
Range		42,77
Minimum		72,62
Maximum		85,12

a. Multiple modes exist. The smallest value is shown

It is known that variable Y has Mean = 157, Standard Deviation = 26, Median = 241 Modus = 87,32, Maximum score = 85,12 and Minimum score = 72,62.

Table 4. Proportion of students' perceptions on readiness to enter the industrial world

No	Category	Interval	Frequency	Proportion
1.	Very High	> 81,5	68	19,42%
2.	High	74,6%-81,5	178	50,85%
3.	Low	67,7-74,5	57	16,28%
4.	Very Low	< 67,6	47	13,42%
	Total		100	100,00%

Based on the above standard score, it can be seen that 68 students (19.42%) are in the very high category, 178 students are in the high category (50.85%), 57 students are in the low category (16.28%) and 47 students are in the very low category (13.42%). Therefore, it can be concluded that the proportion of student perceptions of the readiness to enter the world of industry in the high category (50.85%).

1.3. Prerequisite Tests

Prerequisite tests are determinants of data analysis used to test the hypotheses. There are two kinds of prerequisite test in this research, namely normality and linearity test, this is tested before conducting hypothesis test and for determining the analysis to be carried out later or the determinant of analysis techniques whether it is parametric or non parametric.

The normality test in this study aims to determine whether the data obtained is normally distributed or not. The purpose of the normality test is for whether the hypothesis is tested parametric or non-parametric. Sample normality testing using the Kolmogorov-Smirnov One-Sample test with the help of SPSS. Normality is known by looking at the significance value that is if the significance value (Asymp. Sig) > 0.05 then the data is normally distributed.

Table 5. Normality test of variables of student perception of the work environment in the industrial world

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Variabel X	,117	350	,235	,947	350	,016

a. Lilliefors Significance Correction

Table 6. Normality test of students' perception of readiness to enter industrial world

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.

Variabel Y	,074	350	,213	,971	350	,204
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a. Lilliefors Significance Correction

The result of normality test shows that: (1) the significance value of variable X is 0.235 and; (2) variable Y is 0.213, where the significance value of each variable is more than 0.05 so that it can be concluded that the research data for each of these variables is normally distributed.

Table 7. Anova linearity

			Sum of Squares	df	Mean Square	F	Sig.
(Combined)			1457,3	37	39,3	2,192	,049
X * Y	Between Groups	Linearity	811,26	1	811,	45,148	,000
		Deviation from Linearity	646,06	36	17,9	,999	,719
	Within Groups		323,44	18	17,9		
	Total		1780,7	55			

Linearity test is used to determine whether the relationship between independent and dependent variables is linear. This study uses a linearity test with the help of SPSS, where if the probability value (Asymp. Sig) <0.05 then the data distribution is linear. The result of the linearity test shows that the significance value of each variable relationship is 0.00. The result of linearity test of all variables are stated to be less than 0.05 so it can be concluded that the data between two variables (independent and dependent variables) has a linear relationship.

1.4. Hypothesis Testing

Hypothesis testing is carried out to find out how much the influence of independent variables towards dependent variable, either partially or simultaneously. The test uses the help of the SPSS program with a simple linear regression test.

Table 8. Results of regression analysis that show the range of correlation between binded variables and free variables

		Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression		811,263	1	811,263	62,324	,000 ^b
	Residual		969,509	54	17,954		
	Total		1780,772	55			

a. Dependent Variable: X

b. Predictors: (Constant), Y

The result of simple regression analysis indicates that R = 0.675 which means the value of the correlation coefficient is 0.675, R Square (R²) multiplied by 100% = 0.756x100% = 75.6%. This number has the intention that that variable X has an influence of 75.6% while 24.4% is influenced by other variables that cannot be revealed in the study.

Table 9. Anova determination coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	64,852	3,468		15,847	,000
X	,327	,031	,725	6,722	,000

a. Dependent Variable: Y

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
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The test results found with significance = sig. value is < 0.05, which means that the significant effect on variable Y.

1	,875 ^a	,756	,635	4,23720
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a. Predictors: (Constant), X
b. Dependent Variable: Y

the F value is 62,324 0,000, because of the then H₀ is rejected, variable X has a

Table 10. Coefficients influence of sig. Variabel X towards variable Y

The coefficients influence of sig. variable X to Y is obtained by the formula $\hat{Y} = a + bx$. Regression equation $\hat{Y} = 54,951 + 0,212 X$ states that if there is no increase of variable X, the value of the variable is 64,852. Regression coefficient of 0.327 states that each change (because of the + sign) of one value in variable X will give an increase of 0.212. 2) Beta value indicates the effect of variable X with variable Y, where the Beta value is 0.725. The sig. value is 0,000 shows that there is a significant effect of variable X to Y because 0,000 < 0,05 where 0.05 is a significant level.

The result of the significance test in the ANOVA table shows (value) Sig is 0,000. When compared to $\alpha = 0.05$, the value of Sig. is smaller than α (Sig. $\leq \alpha$) which is 0,000 \leq 0,05. This means that H₀ is rejected and H_a is accepted, then there is a significant influence between variable X and Y. Based on variable X and Y can be seen by looking at the value of R2 in the Model Summary table (previously). The interpretation obtained is (value) R Square (R2) = 0.756x100% = 75.6%. This value indicates that the influence of variable X towards variable Y is 75.6% and the influence of the other variables towards variable X is 24.4%.

4. Discussion

Based on regression analysis, the results reveal that the perception of vocational students in machining engineering expertise in Makassar contributes 75.6% towards work environment to improve their readiness to enter the industry. With a variety of knowledge and insight into the work environment in the form of replicas of the industrial world, students will more easily prepare themselves to work in accordance with their field of interest.

The work environment is very important to note in the vocational schools environment. It relates directly to the teacher and students who carry out the process of teaching and learning activities. The work environment is a condition that exists around the workplace that can affect one's performance in carrying out their duties both directly and indirectly and affect the optimization of the results obtained and also affect the productivity of school institutions in general.

Practicum place for vocational students is important in encounter their future work, prepare themselves to work based on their expertise after graduation. Regarding to this, Zawawi (2012) states that there is a significant relationship between the practice of school production units, apprenticeship, and family support for work readiness. Marwanto, (2014) revealed that a conducive working environment can provide a sense of security and enable employees to work optimally. In addition, in the context of vocational learning, the work environment can shape students' knowledge in developing work readiness which includes academic skills, technical skills, values, and attitudes to support their potential development.

The results by other researchers support the findings of this study, therefore it can be concluded that the work environment has a significant relationship to readiness in entering the industrial world by the vocational students majoring machining engineering in Makassar.

5. Conclusion

Based on the results of the analysis and discussion, it can be concluded that; (1) Students' perception of the work environment are 53.15% and categorize as high, (2) Students' perceptions of readiness in facing the industrial world is 50.85% and categorize as high, and (3) There is a relationship between students' perceptions of the work environment and readiness in facing the world of work (75.6%).

Based on the results of this study, the researchers suggest for vocational schools that can be used as a material evaluation about the student work environment to be adapted into the world of industry. Schools can arrange programs by involving industry, so students can get information and descriptions of the industry and will prepare themselves better to enter the workforce. The realization of work readiness of vocational graduates can be done by applying vocational learning methods that are able to describe and provide information about the work environment to support the development of skills in accordance with specifications and qualifications in entering the industry.

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